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# 'Feeling' Risk and Seeing Solutions

## Predicting Vaccination Intention against Hepatitis B Infection among Men Who Have Sex with Men

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### Abstract

This study assessed cognitive and affective predictors of intention to obtain vaccination against the hepatitis B virus (HBV) among men who have sex with men (MSM), based on leading social cognitive models of health behavior. The key predictors of vaccination intention were perceived risk of contracting HBV, expectancies regarding the outcome of vaccination, and the interaction between risk perception and outcome expectancies. Negative affect increased risk perceptions, which, in turn, positively affected vaccination intention. It is concluded that MSM should *feel* they are at risk for HBV, and see solutions to this risk.

### Keywords

- *health behavior*
- *hepatitis B virus*
- *MSM*
- *negative affect*
- *outcome expectancies*
- *risk perception*
- *vaccination intention*

HEPATITIS B (HBV) is a sexually transmitted infection with severe health consequences, such as cirrhosis and insufficiency of the liver (Lai, Ratziu, Yuen, & Poynard, 2003). It is estimated that about two billion people worldwide have been infected with HBV, and more than 350–400 million individuals are chronic carriers of the virus (see Lai et al., 2003). In the Netherlands, the incidence rate of newly diagnosed acute and chronic infections has been increasing, in particular among men who have sex with men (MSM; van de Laar, De Boer, Koedijk, & Op de Coul, 2005). Vaccination against HBV is offered free of charge to at-risk communities, but uptake has remained limited (van Steenbergen & the Working Group Vaccination High-risk Groups Hepatitis B for the Netherlands, 2002). The objective of the present study is to contribute to a better understanding of factors that promote or hinder HBV-vaccination among MSM.

The formation of an intention to engage in a health-related action, such as obtaining HBV-vaccination, is an important first stage in the process of health behavior change (see Conner & Norman, 2005). At this stage, three factors are thought to play a crucial role: (1) risk perception; (2) outcome expectancies; and (3) perceived self-efficacy (see, for example, Schwarzer, 2001). Risk perception is considered a necessary antecedent of protective health behaviors in leading health behavior models, such as the Health Belief Model (e.g. Janz & Becker, 1984), Protection Motivation Theory (e.g. Rogers, 1983), and stage theories of health behavior (e.g. Prochaska & DiClemente, 1983). Research confirms that risk perception is an important predictor of vaccination against HBV among MSM who had obtained vaccination (De Wit, Vet, Schutten, & van Steenbergen, 2005). In addition, evidence is mounting that affective responses play an important role in promoting risk perceptions: individuals may *feel* risk before cognitively perceiving it (see, for example, Adolphs & Damasio, 2001). Affect can work at the unconscious level and function as a warning signal that 'something is wrong' before cognition picks up on any danger (Loewenstein, Weber, Hsee, & Welch, 2001). Some level of negative affect may be needed before individuals cognitively appraise that they are at risk and become motivated to change their behavior (Cameron, 2003; De Wit, Das, & De Hoog, 2007; McCaul & Mullens, 2003). Indeed, recent research shows a positive relationship between

negative affect, risk perception, and precautionary behavior (Das, De Wit, & Stroebe, 2003; De Hoog, Stroebe, & De Wit, 2005). However, rather than suggesting an additional predictor of health behavior that is missing from current models, we propose that negative affect constitutes a trigger for the appraisal of personal risk perception.

Outcome expectancies, or beliefs regarding the efficacy of a proposed means to alleviate a threat and the potential costs of enacting a recommended behavior, present a second cognitive prerequisite for health behavior that is included in current models, including the Theory of Planned Behavior (e.g. Ajzen, 1991) and Social Cognitive Theory (e.g. Bandura, 1989). Outcome expectancies are likely to play an important role in the uptake of HBV-vaccination. MSM may have flawed assumptions regarding potential side-effects of vaccination, be unaware of the benefits of vaccination against HBV, or perceive potentially stigmatizing reactions (see De Wit et al., 2005). The third cognitive factor thought to underlie health behavior is perceived self-efficacy, which refers to an individual's belief in his or her own ability to achieve in a specific goal (e.g. Bandura, 1977). Self-efficacy beliefs are particularly critical for relatively complex health behavior goals, such as consistent condom use. For simpler behaviors such as vaccination against HBV, self-efficacy may play a less pivotal role (see De Wit et al., 2005). According to the gist of theoretical reasoning, risk perception, outcome expectancies, and self-efficacy should exert interactive effects on behavior, but these effects are inconsistently obtained (see Rogers, 1983), and mostly replaced by additive formulations (see Conner & Norman, 2005).

## Overview

This study presents a first test of the interplay between affective and cognitive predictors of intention to obtain HBV-vaccination in MSM: negative affect, risk perception, outcome expectancies, and self-efficacy. It is hypothesized that negative affect promotes risk perception, which, in turn, promotes vaccination intention. Risk perceptions and outcome expectancies are expected to exert interactive effects on vaccination intention, with highest intention when both risk perception and outcome expectancies are high. Self-efficacy is not expected to be related to MSM's intention to obtain vaccination against HBV.

## Method

### Procedure and participants

A sample of 86 MSM was recruited: (1) via gay organizations in Amsterdam; (2) from a focus group on HBV-prevention in Rotterdam; and (3) in gay clubs in four mid-sized cities in different regions of the country. Of the respondents, 32 men were infected with hepatitis B or had been vaccinated against hepatitis B. These men were excluded from the study, as was one participant whose scores fell outside the normal distribution range ( $SD > 3$ ). This left a convenience sample of 53 MSM, with a mean age of 33 years ( $SD = 12$ ). Most of the participating men had no steady partner (60%). On average, participants had four male sex partners in the previous six months. Most participants were of Dutch origin (88%); the remaining men were of Moroccan, Turkish or Surinamese origin.

### Predictor variables

*Negative affect* was measured with nine items derived from well-validated measures of affect (Watson, Clark, & Tellegen, 1988; see Das et al., 2003), for instance: 'When thinking about the health consequences of hepatitis B infection, I feel ...' (e.g. tense, anxious; 1 = *not at all*; 7 = *very much*; Cronbach's  $\alpha = .90$ ).

*Risk perception* of HBV-infection was assessed with four items regarding susceptibility and personal risk (see Das et al., 2003; De Hoog et al., 2005), for instance: 'It is quite possible that I will become infected with hepatitis B' (1 = *totally disagree*; 7 = *totally agree*) and 'The likelihood that I become infected with hepatitis B is ...' (1 = *very small*; 7 = *very large*; Cronbach's  $\alpha = .77$ ).

*Outcome expectancies* of vaccination against hepatitis B were assessed with three items derived from De Wit et al. (2005), for instance: 'Vaccination against hepatitis B is very effective for everyone' and 'Vaccination against hepatitis B prevents individuals from getting this disease' (1 = *totally disagree*; 7 = *totally agree*; Cronbach's  $\alpha = .52$ ).

*Perceived self-efficacy* to obtain vaccination against hepatitis B was assessed with four items (see De Wit et al., 2005), for instance: 'Do you think you will be able to complete the vaccination procedure?' (1 = *definitely not*; 7 = *definitely*) and 'For me, getting the vaccination is ...' (1 = *very easy*, 7 = *very difficult*; Cronbach's  $\alpha = .77$ ).

### Dependent variable

*Intention to obtain vaccination* against hepatitis B was assessed with three items, for instance: 'Do you

intend to obtain vaccination against hepatitis B in the near future?' (1 = *definitely not*; 7 = *definitely*) and 'How likely is it that you will obtain vaccination against hepatitis B in the near future?' (1 = *very unlikely*, 7 = *very likely*; Cronbach's  $\alpha = .95$ ).

## Results

### Means and correlations

Overall, MSM experienced moderate levels of negative affect regarding HBV ( $M = 4.4$ ,  $SD = 1.0$ ), and held moderate perceptions of risk of infection ( $M = 4.4$ ,  $SD = 1.2$ ). Outcome expectancies were positive ( $M = 5.5$ ,  $SD = .95$ ), as were self-efficacy beliefs ( $M = 5.8$ ,  $SD = 1.2$ ). Vaccination intention on average was high ( $M = 6.0$ ,  $SD = 1.5$ ). All predictors correlated significantly with vaccination intention ( $r_{\text{affect}} = .30$ ,  $p < .01$ ;  $r_{\text{risk perception}} = .40$ ,  $p < .01$ ;  $r_{\text{outcome expectancies}} = .38$ ,  $p < .01$ ;  $r_{\text{self efficacy}} = -.33$ ,  $p < .05$ ). There was a significant correlation between negative affect and perceived risk of contracting hepatitis B ( $r = .41$ ,  $p < .001$ ), and a marginally significant correlation between perceived risk and self-efficacy ( $r = -.25$ ,  $p < .10$ ). Outcome expectancies and self-efficacy were unrelated.

### Predicting vaccination intention

A multiple linear regression analysis was performed with intention as the dependent variable. Negative affect was introduced as a predictor of intention in the first of four blocks. Next, the social-cognitive predictor variables were entered in separate blocks (see Schwarzer & Fuchs, 1996). Risk perception was entered in the second step, followed by outcome expectancies and self-efficacy in the third step. Z-scores were calculated for risk perception and outcome expectancies, and an interaction term was created to assess the joint impact of these predictors on intention. This interaction term was entered in step four.

In step one negative affect was significantly related to intention to obtain HBV-vaccination ( $\beta = .30$ ,  $p < .05$ ). As expected, this effect became, however, non-significant after entering perceived risk as a second predictor, the effect of which was significant ( $\beta = .39$ ,  $p < .01$ ). Negative affect and risk perception together accounted for 18.1 percent of the variance. To conduct a formal test of mediation (see Baron & Kenny, 1986), risk perception was regressed on affect ( $\beta = .41$ ,  $p < .01$ ), vaccination intention was regressed separately on affect ( $\beta = .30$ ,  $p < .05$ ) and risk perception ( $\beta = .40$ ,  $p < .01$ ), and

intention was regressed simultaneously on negative affect and risk perception. A Sobel test confirmed that the effect of negative affect on intention was mediated by risk perception ( $Z = 1.91, p = .056$ ).

In step three, vaccination intention was significantly related to perceived risk ( $\beta = .29, p < .05$ ) and outcome expectancies ( $\beta = .34, p < .01$ ). The effect of self-efficacy was non-significant ( $\beta = -.21, NS$ ), and the model accounted for 31.5 percent of the variance in vaccination intention. The interaction between risk perception and outcome expectancies (block 4) was significant ( $\beta = -.26, p < .05$ ) and increased explained variance to 38.8 percent. Further exploration of the interaction (see Aiken & West, 1991) revealed that vaccination intention was low when risk perception and outcome expectancies were both low ( $M = 3.2$ ). In the remaining conditions, vaccination intention was high ( $M = 6.8$  for high outcome expectancies/low risk perceptions;  $M = 6.2$  for high risk perceptions/low outcome expectancies;  $M = 6.3$  for high risk perceptions/high outcome expectancies).

## Discussion

Risk perception and outcome expectations were key predictors of intention to obtain vaccination against HBV among MSM in the Netherlands. Vaccination intention was higher for men who perceived themselves to be at higher risk for infection with hepatitis B. This finding is in line with previous research (De Wit et al., 2005), and points to the importance of promoting adequate perceptions of personal risk in health promotion (see Weinstein, 2003). Expectancies concerning the outcome of vaccination were a second important predictor of vaccination intention. Participants who perceived vaccination as an effective strategy to reduce their future risk of hepatitis B infection had a higher intention to obtain vaccination than did participants who had less positive beliefs regarding the efficacy of vaccination. The observed interactive effect of risk perception and outcome expectancies illustrates that campaigns that target both risk perception and outcome expectancies are most likely to succeed in promoting motivation to obtain HBV-vaccination in MSM.

The present findings may explain why previous strategies that focused on the elimination of financial hurdles, by offering vaccination free of charge, may not be enough to motivate MSM to obtain vaccination against hepatitis B. Health promotion campaigns should underline the effectiveness of

hepatitis B vaccination in preventing infection and other positive effects of vaccination (see Das et al., 2003; De Hoog et al., 2005), and address potential negative social consequences related to stigmatization (De Wit et al., 2005). Vaccination campaigns should also aim at increasing risk perceptions, for instance by providing prevalence rates in MSM. In the present study, negative affect increased risk perceptions, which, in turn, increased vaccination intentions. This suggests that individuals may need to *feel* that they are at risk before they start to reflect cognitively on their personal risk. Accordingly, campaigns that target risk-related negative affect by presenting personalized narrative—rather than abstract statistical evidence—regarding the risk of contracting HBV (De Wit, Das, & Vet, in press) are most likely to effectively increase perceived risk.

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